

Pending Claims

Claims 1 – 29 (canceled).

Claim 30 (previously presented) An apparatus for conducting acoustic logging measurements of formation surrounding an earth borehole, comprising:

an acoustic logging instrument having first and second ends for connecting said instrument into a drillstring used for drilling earth boreholes, said logging instrument comprising an acoustic transmitter for transmitting acoustic signals into the formations surrounding said earth borehole, an acoustic receiver for receiving acoustic signals returning from said formations and which may also respond to noise signals, one or more sensors responsive only to noise signals, to the exclusion of the acoustic signals returning from said formations, and an electronic processor in said instrument for combining the signals received by said acoustic receiver and by said noise sensor to produce signals having significantly reduced noise signal components.

Claim 31 (previously presented) The apparatus according to Claim 30, wherein said electronic processor comprises an analog-to-digital converter and said acoustic signals received returning from the earth formation and said acoustic noise signals received are converted from analog to digital form prior to being combined to produce signals having significantly reduced noise signal components.

Claim 32 (previously presented) The apparatus according to Claim 31, comprising circuitry for generating a propagation factor relating to the propagation of noise signals between said noise sensor and said acoustic receiver, and for modifying the noise signals based upon said propagation factor prior to being combined with the acoustic signals returning from the earth

formations to produce signals having significantly reduced noise signal components.

Claim 33 (previously presented) An apparatus for conducting acoustic logging measurements of formations surrounding an earth borehole, comprising:

an acoustic logging instrument having first and second ends for connecting said instrument into a drillstring used for drilling earth boreholes, said logging instrument comprising an acoustic transmitter for transmitting acoustic signals into the formations surrounding said earth borehole, at least two acoustic receivers for receiving acoustic signals returning from said formation and which may also respond to noise signals, one or more sensors responsive only to noise signals, to the exclusion of the acoustic signals returning from said formations, and an electronic processor in said instrument for combining the signals received by said acoustic receivers and by said noise sensor to produce signals having significantly reduced noise signal components.

Claim 34 (previously presented) The apparatus according to Claim 33, wherein said electronic processor comprises an analog-to-digital converter and said acoustic signals received returning from the earth formation and said acoustic noise signals received are converted from analog to digital form prior to being combined to produce signals having significantly reduced noise signal components.

Claim 35 (previously presented) The apparatus according to Claim 34, comprising circuitry for generating one or more propagation factors relating to the propagation of noise signals between said noise sensors and said acoustic receiver, and for modifying the noise signals based upon said propagation factors prior to being combined with the acoustic signals returning from the earth

formation to produce signals having significantly reduced noise signal components.

Claim 36 (previously presented) An apparatus for conducting acoustic logging measurements of formations surrounding an earth borehole, comprising:

an acoustic logging instrument having first and second ends for connecting said instrument into a drillstring used for drilling earth boreholes, said logging instrument comprising an acoustic transmitter for transmitting acoustic signals into the formations surrounding said earth borehole, at least two acoustic receivers for receiving acoustic signals returning from said formation and which may also respond to noise signals, at least two sensors responsive only to noise signals, to the exclusion of the acoustic signals returning from said formations, and an electronic processor in said instrument for combining the signals received by said noise sensors and by said acoustic receivers to produce signals having significantly reduced noise signal components.

Claim 37 (previously presented) The apparatus according to Claim 36, wherein said electronic processor comprises an analog-to-digital converter and said acoustic signals received returning from the earth formation and said noise signals received are converted from analog to digital form prior to being combined to produce signals having significantly reduced noise signal components.

Claim 38 (previously presented) The apparatus according to Claim 37, comprising circuitry for generating one or more propagation factors relating to the propagation of noise signals between said noise sensors and said acoustic receivers, and for modifying the noise signals based upon said propagation factors prior to being combined with the acoustic signals returning from the

earth formation to produce signals having significantly reduced noise signal components.

Claim 39 (previously presented) The apparatus according to Claim 38, wherein each of said noise sensors is positioned within said logging instrument to detect noise signals propagating towards the said sensors.

Claim 40 (previously presented) The apparatus according to Claim 38, wherein at least one of said noise sensors is positioned to detect a noise signal propagating from above and toward the one acoustic receiver, and at least another of said noise sensors is positioned to detect a noise signal propagating from below and toward the one acoustic receiver.

Claim 41 (previously presented) An apparatus for conducting acoustic logging measurements of formations surrounding an earth borehole, comprising:

an acoustic logging instrument having first and second ends for connecting said instrument into a drillstring used for drilling earth boreholes, said logging instrument comprising an acoustic transmitter for transmitting acoustic signals into the formations surrounding said earth borehole, an acoustic receiver receiving acoustic signals returning from said formation and which may also receive noise signals, at least two sensors responsive only to noise signals, to the exclusion of the acoustic signals returning from said formations, and an electronic processor in said instrument for combining the signals received by said acoustic receivers and by said noise sensors to produce signals having significantly reduced noise signal components.

Claim 42 (previously presented) The apparatus according to Claim 41, wherein said electronic processor comprises an analog-to-digital converter and said acoustic signals received returning

from the earth formation and said noise signals received are converted from analog to digital form prior to being combined to produce signals having significantly reduced noise signal components.

Claim 43 (previously presented) The apparatus according to Claim 42, comprising circuitry for generating one or more propagation factors relating to the propagation of acoustic signals between said noise sensors and said acoustic receiver, and for modifying the noise signals based upon said propagation factors prior to being combined with the acoustic signals returning from the earth formation to produce signals having significantly reduced noise signal components.